LAMBERT

* * * * * * * * * * * * * * *

Memorandum on the Ideal Development

of Hospital and Medical School

WZ 270.C7 L172 1912 c.1
M247.C7 L172

R747.C7 L172

,G12
C.1

Columbia University
in the City of New York

College of Physicians and Surgeons

Library

Digitized by the Internet Archive
in 2010 with funding from
Open Knowledge Commons

http://www.archive.org/details/memorandumonidea01lamb

MEMORANDUM

ON

THE IDEAL DEVELOPMENT

OF

HOSPITAL AND MEDICAL SCHOOL

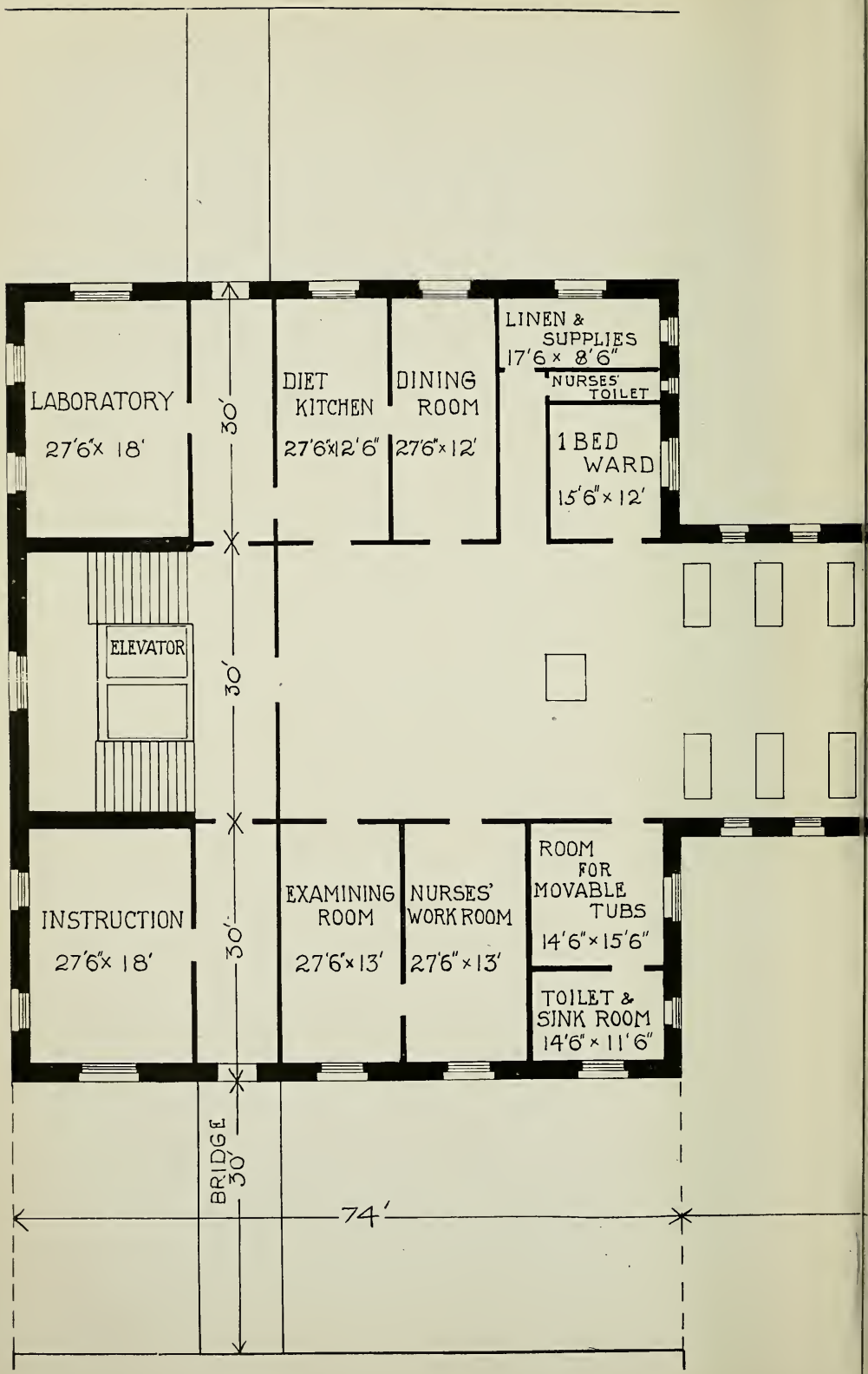
Addressed to the Trustees of Columbia University
and the Managers of the Presbyterian Hospital

BY

SAMUEL W. LAMBERT, M.D.
Dean of the College of Physicians and Surgeons
Columbia University

PRINTED FOR PRIVATE DISTRIBUTION
NEW YORK, MARCH, 1912

Spec-Coll
X-Coll
R
747
.C7
L172
1912
C.1


LABORATORY
27'6"x 18'
DIET KITCHEN
27'6"x12'6"
DINING ROOM
27'6"x12'
LINEN & SUPPLIES
17'6 x 8'6"
NURSES' TOILET
1 BED WARD
15'6"x12'
ELEVATOR
INSTRUCTION
27'6"x 18'
EXAMINING ROOM
27'6"x13'
NURSES' WORK ROOM
27'6"x13'
ROOM FOR MOVABLE TUBS
14'6"x15'6"
TOILET & SINK ROOM
14'6"x11'6"
30'
30'
30'
BRIDGE
30'
74'

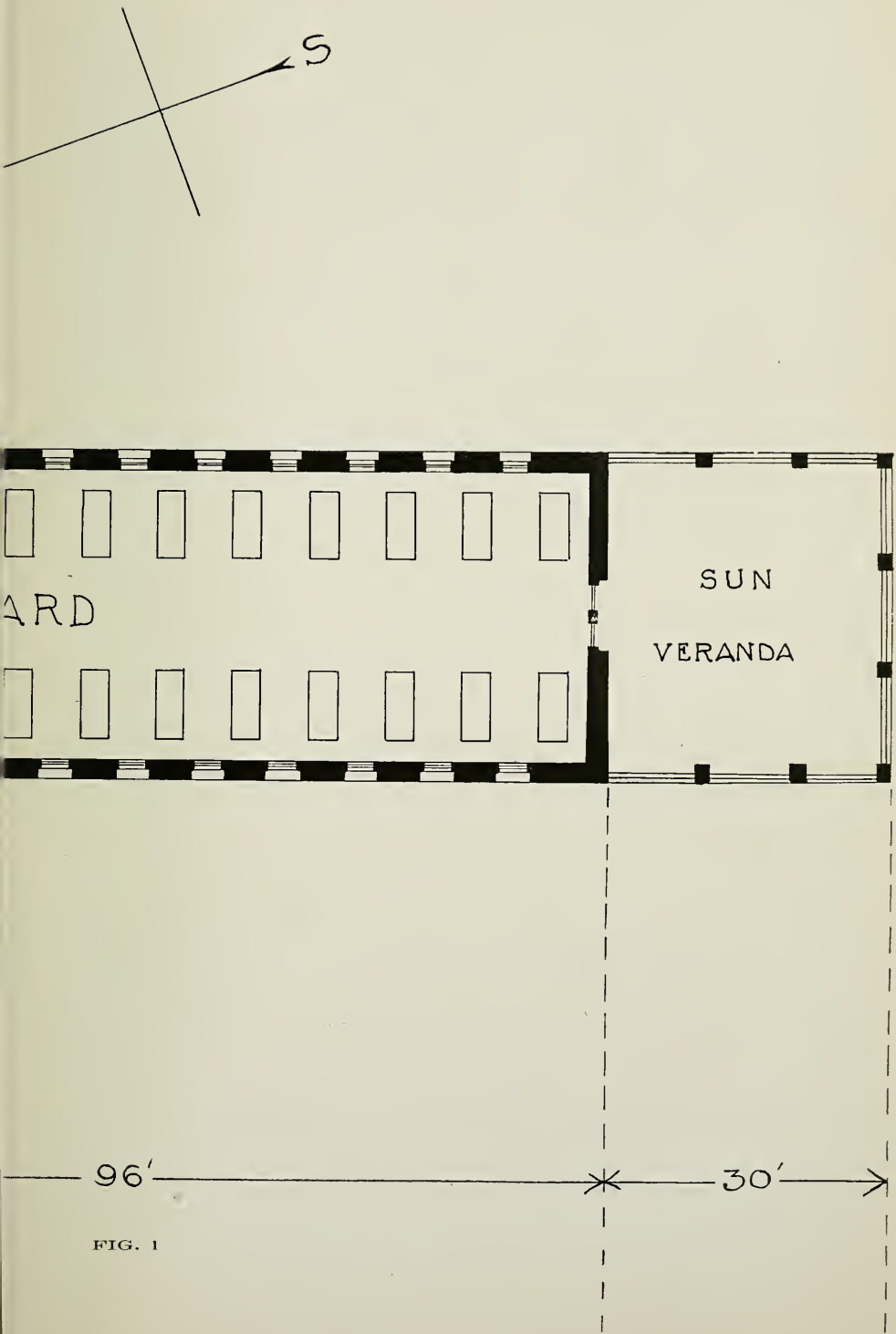


FIG. 1

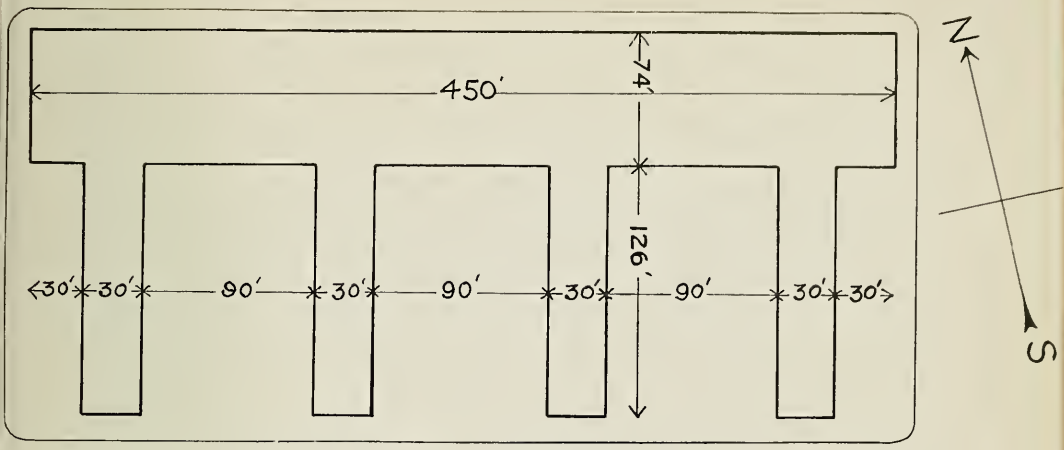

450'
74'
126'
30'
30'
90'
30'
90'
30'
90'
30'
30'
N
S

FIG. 2

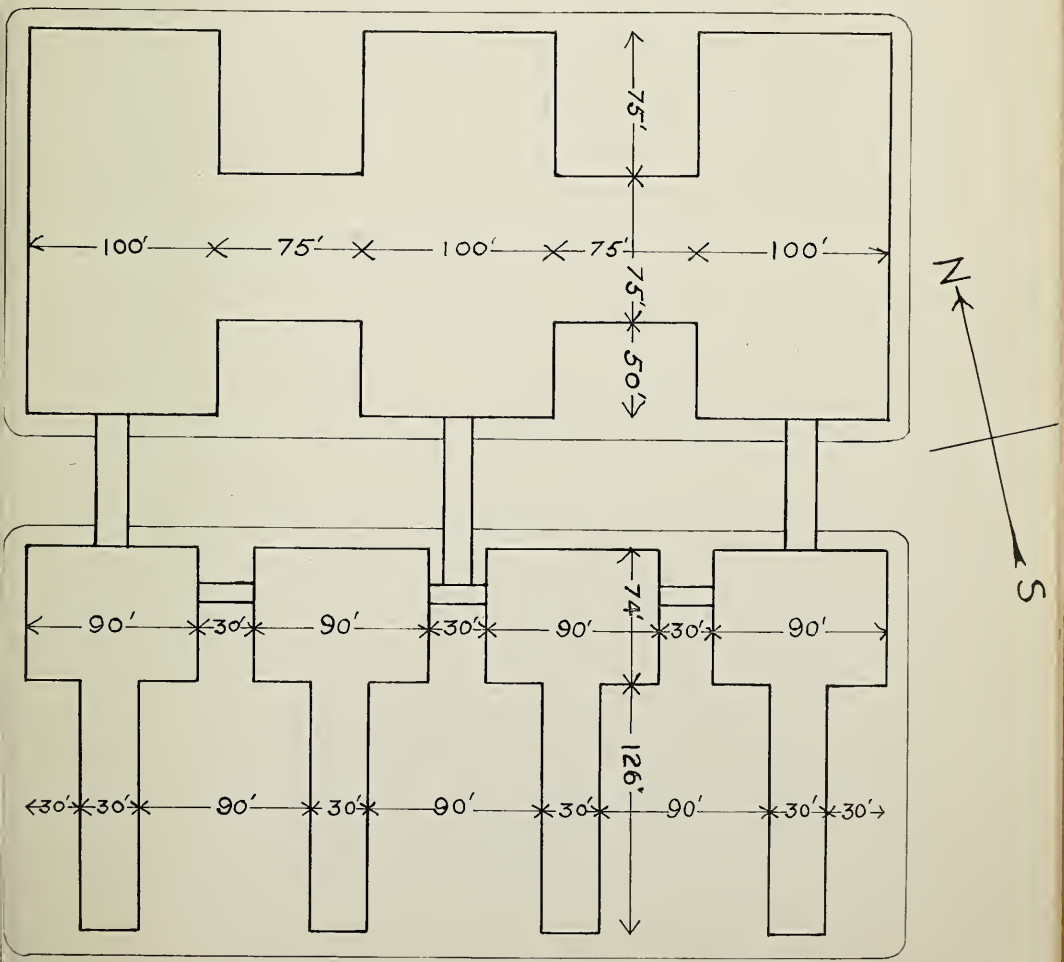

75'
100'
75'
100'
75'
100'
75'
50'
74'
126'
90'
30'
90'
30'
90'
30'
90'
30'
30'
90'
30'
90'
30'
90'
30'
30'
N
S

FIG. 3

To the Board of Trustees of Columbia University and the Board of Managers of the Presbyterian Hospital,

Gentlemen:

Some years ago I prepared a study of the relations between hospitals and medical education in order that the subject might be presented to the Committees of the Roosevelt Hospital and of Columbia University who were considering at that time the possibility of a closer relationship between those two institutions. That negotiation failed to accomplish any result whatever, but an alliance between Columbia and the Presbyterian Hospital has been entered into for the same purposes as then contemplated and the following study of the same subject; hospitals and medical education has been made with the hope that it might assist in formulating plans for the future development of both the Presbyterian Hospital and the College of Physicians and Surgeons under that argeement.

The opinions expressed in the following pages are entirely my personal views. They represent, so far as I know, in no sense the ideas either of any other member of the medical faculty or of the executive officers of the University. Nor have I consulted in preparing this paper the opinions of the members of the Medical Board or of the Board of Managers of the hospital. It seems to me that a full discussion of the problems now before the University and the hospitals should be had at the present time in order that this alliance may result in as perfect an institution for medical teaching and research as can possibly be brought about. In order that this end may be furthered I have had these pages printed and distributed to the members of your boards.

This alliance for the advancement of medical education and medical science between the Presbyterian Hospital and Columbia University finds both institutions in an enviable condition. Both the hospital and the medical department

of the University are occupying buildings which they have outgrown and which they are anxious to replace with modern plants and as far as possible with model institutions. Before this alliance was consummated Columbia University was endeavoring to secure a site for the rebuilding of the College of Physicians and Surgeons in 116th Street near the rest of the University and the Presbyterian Hospital had purchased a site at 67th Street and East River on which to build a new hospital. The purpose of this pamphlet is to discuss the many questions which arise as a result of this Hospital-University alliance.

The first question to come to one's mind is that raised by this very fact that both these institutions had already considered the advisability of building new quarters in different parts of the city. The one preëminent idea which has never varied in the conclusions of all who have considered this alliance is that the new hospital and the new school must be built in close physical relationship one to the other. This fact seems self-evident and no argument in favor of a divided school and hospital has been even suggested which seems worthy of refutation. This question of propinquity is therefore not touched upon now, but is assumed as settled. Another question which is even more important is that of the financial means of carrying out these projects. This also is not discussed at this time, but an attempt will be made to draw up a scheme for an ideal institution combining a medical school and hospital so far as such an institution can be outlined under the conditions imposed by a site in a large city in general and in New York in particular and any scheme of financing the plans which may be finally adopted is left for future and more confidential discussion.

The essential characteristics of a site for a hospital are a southern exposure insuring an excess of sunlight and fresh air for its wards, its flat roofs and balconies. A school of medicine should demand from its site a northern exposure to secure clear steady light for its laboratories and scientific workrooms. The administrative and secondary workrooms in both hospital and school and the accommo-

dations for students in the school can be fitted in to the general plans without special reference to the points of the compass. An ideal combination of school and hospital in close proximity would seem to be possible without sacrifice to any essential element of either by securing a site large enough to place the hospital on its southern and the medical school on its northern portion. The only prominent detail remaining is the securing of easy and sufficient access between the correlated parts of the two members in the partnership. The street plan of New York lends itself admirably to such a solution because the long side of the city blocks runs east and west, but it will be found that these same conditions limit the choice of plans to a considerable extent. The problem to be solved is really a new one in New York at least so far as the complexity of the whole subject and most of its details are concerned. Other teaching hospitals exist, but they are limited in their scope to some special feature of medical education, either to a medical specialty like obstetrics or to post-graduate teaching. No large general hospital has ever been built in New York which would have a medical school in close affiliation.

The two graduate schools of New York were both built to give instruction to medical men. Their problems, however, are quite different from the needs of a school and hospital designed especially for undergraduate instruction. The Flower Hospital of the Homeopathic school of New York was built for an undergraduate school and undoubtedly meets many of the demands for such a hospital. Its site, however, is limited in area and required some limitation to the best development. Its wards are placed on an east and west axis and as is shown below this in itself is a serious criticism of the general plan. The two most prominent examples of hospitals built for teaching purposes are the two large maternity hospitals, the Sloane Hospital for Women and the Lying-in Hospital. The Sloane was built on the Corridor principle of small wards of four to six beds each and its close connection with the College of Physicians and Surgeons make unnecessary any special provision for the care of students except a students'

dormitory and workroom. The Lying-in Hospital on the contrary aimed to provide a complete residence and workroom and a school of instruction with library and museum not only for the students to be taught in the hospital wards, but also to care for the larger student body who were assigned to the out-patient service connected with the hospital. Although devoted to a single branch of medicine—obstetrics, the Lying-in Hospital is well worth a study by anyone who contemplates designing a teaching hospital. The hospital was begun in 1899 on plans which were the result of five years' study of the best hospitals in Europe and America. The general design consists of devoting the lower stories to the school, to the nurses' home and to the hospital administration, and placing the wards in the upper three stories. This hospital is built around a central court and the dormitory quarters for staff, students, nurses and employees are for the most part in the lower stories on this central exposure and on the north side where the least sunlight is to be found. The ward details will be referred to again in discussing the ideal plan of hospital construction. In general it can be said that the Lying-in Hospital when built came nearer to fulfilling the theoretical requirements for a healthy block hospital than any of its predecessors and than many of the hospitals built in New York since then as well.

The Ideal Hospital: The theoretical improvement of hospital building and the practical application of proper hygiene to new construction has interested the best architects and hospital boards for the past many years. During this time, however, some of the worst examples of hospital buildings have been planned and erected in the same communities where the study of healthy hospital construction has been most advanced. Most faults in hospital architecture are being repeated in new construction, not only in America, but in Europe coincidentally with the development of the best examples of hospital plants. The most recent and most scientific literature on this subject is to be found in the German language and the latest German constructions are mostly to be considered models of their

kind. Doctor W. Gilman Thompson has published the conclusions which he reached after an extended study of European hospitals. The opening statement of his paper is enlightening: "The modern idea of the construction of the general hospital building is that the building itself should bear a definite relationship to treatment, that it is more than a mere convenient form of lodging house for the sick."

The success or failure of any hospital plant depends not upon the architectural beauty of its façade, not upon the scientific plants for research and for diagnosis, not upon the auxiliary departments for treatment of the sick, not upon the facilities for education of students and nurses, and not upon the conducting of a more or less elaborate hotel for the wealthy invalid. All of these things are essential to the success of a modern hospital but all of them permit of a certain amount of elasticity in arrangement, in organization and in their position in the buildings relative to the others. The one great important factor in hospital construction is the public ward. The residing place for the sick poor is the element to which all others are secondary and to which they must yield precedence in demands for location, for size and for arrangement. The ward unit with its service rooms must be rightly placed and fitted up or the whole combination for therapeutics, for diagnosis, for research and for education will fail of proper accomplishment.

A healthy ward unit demands full circulation of air around its outside walls; it should be sheltered from the north and northeast; it should be raised above the ground level; its length should be in general north and south with long sides and windows to east and west, both of which should have daily exposure to the sun; it should have cross ventilation from east to west; it should contain beds from 12 to 28 in number, or in some multiple of four; it should have at least one window to every two beds, preferably one to every bed.

The development of hospital construction has been along two different lines known as the pavilion system and the

corridor system. On a strict interpretation of these terms the pavilion hospital is made up of a series of isolated one-story ward units grouped together on a larger or smaller plot of ground. It is an outgrowth of the military barrack hospitals of temporary construction, which were the most successful hospital plants in the army service during the wars of the Middle Nineteenth Century before the true nature of infectious diseases and of wound septicamias was discovered. The typical corridor hospital in like sense is a more or less lofty single building with wards on each story opening off from long connecting passageways or corridors. Such a hospital is known also as a block hospital.

The most recent scientific studies of hospital construction have been published in Germany under the direction both of architects and of sanitary engineers and physicians. The development in Germany has been along the line of the pavilion plan, and new hospitals of this character to accommodate 1000 to 2000 patients have been brought to successful completion in a number of cities. The German authorities admit of no possible solution of this problem except upon the pavilion system. The latest German publication on hospital construction, issued under the title of *Das Deutsche Krankenhaus*, discusses the advantages and disadvantages of both plans and comes to the emphatic conclusion that small hospitals of 50 beds may well be built on the corridor plan, that medium-sized hospitals up to 300 beds may also be so constructed but usually at a loss of efficiency in the essentials of the ward unit. Large hospitals, over 300 beds in size, according to this same authority, can never be built without serious and even criminal neglect except upon a broad application of the pavilion system. The compiler of this work, Dr. Grober, admits the advantages of administration in block hospitals of moderate size, but he would limit the height of such buildings to three stories and the number of beds to 120 as a maximum for a single building. A very recent study of hospital construction has appeared this year in French. It is entitled *La Construction des Hopitaux* and is written by Doctors A. Depage, P. Vandervelde and V. Cheval. Its conclusions

are the same as those of the German authors, that modern hospital construction can be considered only on the basis of the pavilion plan. American writers on hospital construction have been influenced by this uncompromising view of the German and French scientists, and recent articles on the subject have adopted the pavilion system as the only solution for large hospital plants. An important element in the question, at least so far as New York City is concerned, is the price of land. The large pavilion hospitals of Germany are built upon plots of ground which allow to each patient in the hospital from 100 to 500 square meters of hospital land, and this is sometimes increased by the existence of a surrounding park. Such an allowance is prohibitive in New York City. The German and French authorities speak of the possibility of combining the corridor and pavilion plans in one structure but for small hospitals only. Such a combination must be devised if a large hospital plant is to be built in New York on hygienic healthy principles. These European authorities insist on the pavilion plan for large hospitals as offering the only possible solution for a hygienic decentralization of the ward units and they belittle the inconveniences and the increased expenses for a larger personnel which necessarily result from adopting a pavilion plan and which are directly due to the service decentralization of such a plan. This problem is far from insurmountable. Its solution consists in securing as complete an isolation of each ward unit from every other as is secured by separate isolated one-story ward pavilions, and this solution must be applied not only to the ward units on different stories but to those on the same level. This can be done successfully so that the external contour of the buildings does not obstruct the free use of air and sun in the wards and so that the connecting corridors on each floor do not present an unobstructed communication between wards and so that the stairways and elevator shafts for personnel and for service do not offer a direct conduction of air, of noise and of dust between floors. If this be done there is no reason why the various "ward pavilions" of the hospital

should not be placed one above the other for any number of stories with the same hygienic success as results from building these pavilions side by side in an indefinitely large plot of ground. American architects have solved the problem of the skyscraper business building, and the same steel construction can be applied to hospitals. The essentials have been accomplished in New York in at least two different fashions, one of which is represented by the Mt. Sinai and the St. Luke's Hospitals and the other by the Lying-in Hospital. Probably both of these can be still further improved upon.

As already pointed out, the essential element in hospital construction is the ward unit. The ward of a hospital must be constructed to fulfill certain conditions of external relations as well as possess certain internal arrangements if it is to serve its purpose in a satisfactory and hygienic manner. The external relation of a ward to the points of the compass to the other parts of the hospital and to neighboring buildings and to the surrounding streets, will influence the access of sunlight and of air, and also the freedom from dust and smoke quite independent of the size of the wards. All the best authorities agree that in order to fulfill these conditions the ward should be rectangular; that it should have windows on both long sides; that its long axis should be in the general north and south direction; that all auxiliary rooms and connecting corridors should be on the north end, that its south end should be free of all attachments except that possibly a balcony or day sun room for patients might be situated there. This ideal ward must have no obstruction to the south of it to cut off the free approach of direct rays of the sun to its eastern wall during the morning and to the western wall in the afternoon. This protection from shadows refers to the adjacent ward pavilions and other hospital buildings as well as to neighboring structures. If the sunlight be unobstructed it is fair to assume that the currents of air will be sufficiently free of access and windows on the two long sides will ensure a natural cross ventilation. The site of the hospital should be selected as far as possible at a distance from

large factories, and especially from electric power and gas plants, in order that the possibility of nuisance from smoke and cinders and dust may be reduced to a minimum. Two hospitals in New York have protected their southern exposure by securing building sites on the north side of a public park, namely the New York Hospital at its new site and the Lying-in Hospital. Other hospitals in the city have built on the river front, which assures light and air, although the open space is not always on the southerly exposure. But almost none of the metropolitan hospitals have wards designed on this model as approved by most authorities.

In New York only a few examples can be found of wards which approach the ideal here described. The original plans of Roosevelt Hospital called for such an arrangement, and some of its older wards approach this plan, but subsequent buildings have encroached upon the original hospital scheme in a medley of architectural and hygienic ideas. One series of superimposed wards at the Lying-in Hospital was designed to fulfill this condition, and presents a good example of what can be done even upon a site the shape of which is not the most favorable for an ideal hospital. Many New York hospitals have wards of which the long axis runs east and west, this results in a warm, sunny south side and a cold, dark north side. The present New York Hospital has some of the best wards of this kind to be found anywhere; these wards, built thirty-five years ago, have preserved their usefulness because they have been able to borrow sunlight from a large private garden in front of the hospital. Other hospitals, like St. Luke's and Mt. Sinai, have wards with a three-sided exposure, of which the south is the longest and the east and west comparatively short, while the whole north side is for connection with the main buildings. Such wards do not lack sunlight, but there is not a good through and through natural cross ventilation. Circular and octagonal wards have been suggested and tried out, for example, at the General Memorial Hospital. They are probably somewhat easier of internal administration for the nursing service but the radial arrangement

of the beds will interfere with the use of stretchers, although of advantage in separating the heads of the patients one from another. They are difficult to fit into a large hospital plant without waste of space and they present difficulties in ventilation as well unless they are in single-story pavilions. Circular wards cannot be built for more than twelve beds except they become of an unwarranted size.

A number of plans have been suggested recently for hospital ward units which are somewhat bizarre in conception. The plans published in the *International Hospital Record* (May, 1911), for a new hospital at Stamford, Connecticut, are more odd than practicable; the north and south axis is suggested, but the north end is so surrounded by the subsidiary ward rooms that some six beds at that end of the ward would have no direct relation to windows and are placed in what amounts to a deep alcove. Such a plan is viciously conceived and outrages the principles of bed arrangement which is discussed below.

It is exceedingly difficult to understand plans of hospitals as presented in most publications because the points of the compass are not indicated upon the plans, and a knowledge of the direction of the north and south axis of the proposed buildings is absolutely essential to an intelligent understanding of hospital drawings. This is true both in regard to the ward unit itself and in regard to the possible darkness or light of the re-entering angles behind and between the separate hospital buildings which make up the total plant.

The internal arrangements of the ideal hospital ward are equally important with its external environment. In the plan for the external relations of the hospital ward, which is developed above, all the medical auxiliary rooms must be grouped about the north end of the ward. There is a single exception to this arrangement so far as a room or balcony for the outdoor treatment of acute disease or for the convalescent treatment of many patients is concerned. This must have as much sun exposure as is possible, and can be located at the most southerly end of the ward unit provided it is so constructed as not to cast a shadow

on the side walls of the ward. The rooms which must be connected with each ward are a day room, one or two isolation rooms for single patients, a bath room, toilets, a diet kitchen, a dining room for convalescents, a linen room, a work room for the nurses, an examining room and a balcony for fresh air treatment. There should be an office and work room for the attending staff, another for the resident staff and student clerks and a laboratory for routine clinical pathology for each group of wards under a single professional control. These rooms should be grouped about the general connecting corridors and stair and elevator service shafts at the north end of the ward. The ward and its service auxiliaries should be isolated from the rest of the institution by a set of doors in the corridors and the whole system of stairways and elevator shafts should be so separated that they can in no way serve as a direct and constant source of communication for noise and air between the individual ward units and the rest of the hospital plant. This prevention of direct communication through the necessary avenues of intercourse forms the essential detail of that hygienic decentralization which is so much sought after by the modern hospital architects in Europe. This can be secured in a block pavilion hospital equally successfully if not as easily as in a cottage pavilion hospital of the European type. In Figure 1 an attempt has been made to plan a typical ward unit in which the ideals here indicated are in some measure fulfilled, although it is beyond the scope of this paper to detail the plans for a complete hospital. This plan for a ward unit presents the following points: The sun balcony is a continuation to the south of the same diameter as the ward itself. The ward with its medical service appendages abuts on the northern end the general connecting corridor which runs east and west and which separates these portions of the ward unit from the stairways, elevator shafts and rooms for education.

Of the many plans of hospitals which have been published recently that of the new general hospital in Cincinnati presents a ward unit which approximates this

plan as shown in Figure 1. The Cincinnati hospital, however, has a large plot of ground at its disposal, and will build its wards in blocks of three superimposed units on much the same plan as the new Charité in Berlin and the new hospital in Munich (*International Hospital Record,* June, 1911).

In addition a few points which are frequently neglected may also be referred to. The bath room should be fitted to handle the movable tubs which are needed in bedside bathing, especially of typhoid fever cases, for the ordinary stationary tub of a private house has but a limited use in hospital practice. The toilets also should be planned to handle the bed service in an adequate manner. The toilet rooms should be separated from the ward by a vestibule which should have window ventilation and light, and that, too, not giving upon a shaft but out of doors. These necessary appendages to the ward unit have frequently been built in a very cramped manner and of inadequate size. The addition of balconies for the open air treatment of acute diseases to a general medical or surgical ward is a modern necessity, but they should not be built so that they cut off the sunlight and air from the ward itself. Special outdoor wards separate from the regular wards were a better solution of the problem than that these balconies should destroy the hygienic environment of the regular ward units. One of the greatest difficulties in ward construction has been the question of floor material. One must beware of newly patented devices. The last written word is strongly in favor of tiling, which has been used, discarded and now comes into favor again.

The internal distribution of the beds in a ward will determine its shape, and the number of beds, its size. Expert opinion is almost unanimously in favor of arranging the beds along parallel walls so that the head of each bed is against but separated by a short interval from the wall and that each bed shall be between two windows. The least floor space which has been suggested by any reliable expert is the 8 feet of ward length by 13½ feet of ward width by Douglas Galton. This would represent a rec-

tangular ward 27 feet wide in the clear and 8 feet long for every two beds, e. g., a ward of 20 beds would be 80 feet long. This allowance of width gives room for central tables and a free stretcher service, it is a minimum requirement. Continental authorities agree quite closely with this estimate of Galton's. The length per bed varies but little, and the ward width only from 27 to 31 feet. The average number of beds in a single ward is 20, the number may vary advantageously in multiples of four since four beds represents the number which, when devoted to an acute service, will require an additional nurse for the proper care of the patients. In a chronic service or one for lesser ailments six beds may be considered as the nurse-bed unit. A ward of 24 beds therefore could be used advantageously either for an acute or a chronic service and cared for by four or six nurses, as seemed desirable, and 24 would seem to be a rational number of beds for a single ward.

The cubic space per patient would determine the height of the ward. Doctor Grober, in *Das Deutsche Krankenhaus,* warns against too high a ceiling, especially mentioning 16 to 19 feet as having been tried and found undesirable; 15 feet is generally conceded as a desirable height. A ward of 24 beds should be 96 feet long, 28 feet wide and 15 feet high, and would possess 112 square feet and 1,680 cubic feet per bed, which is a liberal allowance. The majority of wards in New York hospitals do not conform to this ideal in internal arrangement any nearer than they do in their external relations. Many of them are wider, have beds on all four walls and with no relation to the window plan, and others are almost square, and one hospital has circular wards. The present New York Hospital has an ideal ward in many particulars, the wards of the Lying-in Hospital, except for an architect's error in making one series less than 27 feet wide, and the larger Roosevelt wards, also are planned on this general interior layout, and all have proved the wisdom of their designers.

If one applies these principles to the building of a hospital in New York it will be found not only that the ideal plan for the ward unit can be carried out in every

particular but that this ideal plan offers the best solution for hospital construction except the building of a small institution of a hundred beds or less is under consideration. The single plots of land or blocks between streets have a rectangular shape with a short side about 200 feet long on the east and west and a long axis of varying length sometimes over 900 feet. Such blocks of land would seem to compel the adoption of this plan for wards running north and south in superimposed groups at regular intervals one from the other, and yet of all the hospitals in the city which own a sufficiently large site or a whole block Roosevelt alone started with such a plan, and the Roosevelt authorities have done their best to destroy by subsequent building the original advantages inherent in its plan. The New York City block offers to the south the best exposure to air and sun that can be found in any city, and the higher placed the ward may be the greater these advantages become. This plan is no very new discovery in hospital construction, but was formulated authoritatively over forty years ago, and the Roosevelt Hospital architect did not necessarily happen on it by a happy chance. The plan of a tall building along the northerly long side of the city block in which all administrative and the more strictly medical work should be done and with wings running from this main building to the south to contain the superimposed wards and their adjunct apartments should have been recognized long ago not only as a proper solution of the hygienic problems of hospital construction but also as New York's specific contribution to those problems.

In the past new hospitals have been built too often by architects who are studying the problem for the first time, and New York City institutions are suffering from this failure to benefit from past experience in hospital buildings. New York is not alone in this respect, for Dr. Grober, in his study of hospitals in Germany, laments that "old errors have been constantly repeated in new buildings." The plan proposed is outlined in Figure 2, which is drawn to occupy a block 200 feet from north to south and 450 feet from east to west. It will admit of an indefinite extension in the

east and west axis by the addition of further ward unit pavilions. The northern main building is represented here as a solid building which can be broken in the upper stories for individual ward units connected by corridor bridges which will facilitate the circulation of air currents between the pavilions. This arrangement of the upper stories is shown in Figure 3. This whole structure would contain, with the four ward unit pavilions shown, 100 patients on each floor, 24 in each ward and one in the isolation room of that ward. All the lower parts of the building would be given up to administration and no patients would be housed until the upper floors were reached. If 300 patients were desired there would be three upper floors for patients, and if four floors were needed to administer and house the attendants needed to care for 300 patients the whole building would be seven stories high. If five lower stories were needed for such extra medical uses the whole structure would have to be eight stories high. The lower floors of such a building, especially on its north front, would be darker and sunless as compared with the upper ward floors, and it is in such location that one should place the dormitories for employees, and such rooms as needed only ventilation without reference to outlook and to sunshine.

The Lying-in Hospital did not possess a properly shaped piece of land to adopt this plan in its entirety but the arrangement of its several stories is designed on these principles and though it is a hospital of only 200 beds it may well serve in many particulars as a model. At least one large hospital has been built on this plan just described as the ideal one for New York and carried to a logical completion. Saint Thomas' Hospital in London is such a hospital, but it fails of securing all the advantages possible in a New York structure because the plot of ground is so placed in regard to the River Thames that the axis of the ward units runs almost due east and west and the connecting main building cuts off the eastern sun exposure. The architects evidently have thought more of the air currents and free space towards the River Thames than of the alternating sunshine on the two sides of the rectangular wards

which would have been made possible by a north and south ward unit axis. Nevertheless, the general plan of Saint Thomas can serve as an example of the development of which such a plan is capable. The new Bellevue in New York has a different general plan and the same error has been committed of seeking sun and air from a river on the east of the site and not from a proper consideration of the points of the compass.

An interesting solution of this problem has been reached by the Building Committee of the Peter Bent Brigham Hospital in Boston. This new institution will furnish a general hospital for the educational work of the Harvard Medical School. The site is a magnificent one and, while somewhat irregular in shape, it is more than 1200x300 feet in size, with the long axis in the general east and west direction. It is proposed to provide eventually for about 350 patients on this site and the general plan of ward unit pavilions running north and south and connected along their north ends with the administrative, educational and scientific parts of the hospital has been adopted. A novel scheme has been applied to each pavilion by which each story has a less length than the one below it. In this way each ward uses the southern part of the roof of the ward below it as a sunning veranda for the convalescent patient or for outdoor treatment. These ward pavilions are only three stories high at their north end and one story at the south. Such a general plan is possible only when a large plot of ground is available, and this hospital is practically a pavilion hospital in the European sense.

Nothing is to be gained by a detailed statement of the general plans of the large European pavilion hospitals, though much can be learned from a study of the ward units and their internal arrangements. It is especially important that the designs of European manufacturers of hospital furniture and of plumbing and household fixtures for hospitals, as well as of scientific instruments, be thoroughly studied.

The Ideal Medical School: The plans for developing this hospital-university alliance must include in addition to

a model hospital also a scheme for ideal buildings for a school of medicine. Such a school must provide for the rooms necessary for administration both of the school itself and of the several departments, also for instruction in lecture, recitation and laboratory work. There must be laboratories for research and departmental libraries. The buildings should be capable of extension to accommodate any new feature in medical science which may be demanded within a reasonable future time. Such a new development is needed to-day in the form of a considerable plant for sanitary science and preventive medicine and provision should be made for this comparatively new science allied to medicine. Rooms for a medical museum both for general museum purposes, the storing of unusual specimens and also for teaching students in the class rooms. The school must provide quarters for the students upon collegiate lines. Not only study rooms and a students' library should be provided in the college buildings but also the school must supply residence halls, recreation rooms and a gymnasium and facilities for exercise. The position of the buildings of a medical school in reference to the points of the compass demands the exact reverse of what is needed by the hospital. The controlling requirement of the ideal school is the need of its laboratories of education and research for direct and unimpeded skylight. The direct rays of the sun are a distinct disadvantage in the use of the microscope and most optical instruments, so that the exposure of the windows of the working rooms of a school of medicine must be towards the north. In order to increase this the buildings should be planned with wings and extensions on the northern façade in the exact reverse of the arrangement proposed above for the plan of the ideal hospital. If one applies this principle of construction to the street and block plan of New York City one would prefer a site which ran through from one side street to another and occupied as much of a city block as might be needed. One would then adopt a ground plan for the medical school which would consist of a main building on the southerly side of the site with perhaps some breaks for entrance of

light on that side but surely with broad and rather shallow extensions on the northerly side. Such a building is outlined in Figure 3, and this plan would secure a maximum of light and air on the northern exposure. In Figure 3 also the combination of school on the north and hospital on the south is shown. And the hospital is represented on its upper or ward unit floors. There have been many buildings either remodeled or built for the express purpose of serving as schools of medicine in New York, and, in fact, the College of Physicians and Surgeons has occupied six homes during its 100 years' existence. No one of all these buildings has ever been planned with an intelligent understanding both of the needs of a school and of the physical conditions of the street plan of New York City.

To plan an ideal combination of hospital and school with particular reference to New York City conditions will require consideration of several possible combinations. The hospital and the school may occupy adjacent blocks either east and west or north and south of each other. If north and south sites can be secured it might be possible to close the intervening street to traffic and make the combined hospital and college sites practically one and the same. The city traffic in the north or south direction is so important that a similar plan could not be brought about for a combined site on the east and west of a city avenue. Both institutions could be placed on the same site by erecting a typical "skyscraper" building and placing the hospital on top of the school. A building 15 stories high might be erected for this purpose, and would present no structural difficulties, although the best interests of both hospital and school could be served by a separation of the two. This solution by superposition was adopted by the Lying-in Hospital, and was a success in that case because the demands of a "school" of obstetrics are limited, and being known beforehand can be planned for. In the case, however, of a large general hospital and a university school of medicine such a plan would necessarily hamper the subsequent growth of both the school and the hospital and it should not be adopted, for no one can foresee many devel-

opments which will surely arise in medical science and education even in the immediate future.

The best plan is the selection of two sites lying north and south of each other in order that the hospital may be placed on the southerly block with a straight façade to the north and the wings for the ward unit pavilions running to the south. The school will then be located on the northerly block with a more or less straight façade to the south and the broad laboratory structures extending northward from the main building. It will then be possible to connect the two allied institutions by tunnels or bridges on any stories that may seem desirable quite irrespective of the fact whether the separating street be open as a thoroughfare or closed to city traffic. And such a combination is shown in Figure 3 as has been already pointed out.

Available Sites: The alliance of the Presbyterian Hospital and the College of Physicians and Surgeons brought together two institutions which had each developed partial plans for its own expansion and rebuilding. The hospital had secured a site on Avenue A, between that street and the East River, and between 67th and 68th Streets. This site is about 200 by 500 feet in size and irregularly rectangular in shape. Columbia University had secured part of a site in 116th Street, between Amsterdam Avenue and Morningside Park, and adjacent to the rest of the University for rebuilding the College of Physicians and Surgeons. The completed site would be about 200 by 400 feet in size. In offering the following discussion of these sites a single-minded purpose has controlled the expression of the views held and of the conclusions reached by considering all the points in favor and against the several possible solutions of the problem presented. That single-minded purpose is to assist both the hospital and the university to develop the best possible teaching and philanthropic institution and to prevent any compromise which will lead to an inferior result which should not be tolerated by either college or hospital. The first general axiom to be formulated is that there should be a new hospital and a new school and that these two must be placed in close proximity one to the

other. The question of propinquity, or adjacency as it may be called, can admit of no difference of opinion. If the hospital is to be built on its 67th Street site it should be done only on the assumption that the school of medicine shall be rebuilt also in the same immediate neighborhood. If lack of funds cannot bring about such a rebuilding of both institutions at the same time at least the land for both must be secured and the plans for both must be prepared even down to small details before any active work is undertaken on either school or hospital plants. This is more true of a hospital than of any other building enterprise, and is well expressed in Dr. Grober's work on The German Hospital as follows: "The erection of a hospital should not be begun until a general and complete program for the building plan has been set forth even to the minutest detail." It is more than doubly true for the double plant of a hospital and a school. It is wise to consider both sites, that at 67th Street and East River, and that at 116th Street and Morningside Park, from the viewpoint both of the hospital and of the school, but especially of the combined plant.

The 67th Street site is bordered on the east by the river, looking over to Blackwells Island and its city hospitals, on the south by the vacant land and buildings of the Rockefeller Institute, on the north by a large brewery which occupies the whole length of the block, and on the west by some lots of land across Avenue A, which are at present vacant. When this land was acquired by the hospital there was no thought of any future alliance with Columbia, either for educational or for scientific work. On the contrary, there existed an intimate but loose connection between the pathological department of the hospital and the Rockefeller Institute. The site was, therefore, a logical one to secure for a new hospital site. It had many advantages as a hospital site and it has them yet. This nearness of the Rockefeller Institute is an excellent asset for any general hospital. This Institute is bound to become one of the greatest centers of medical research in the world, and even in its short life of ten years it has already built up an enviable reputation. Nearness to this center is an excellent asset for

a school of medicine. And for the combined institution, which must be proposed and planned by this Columbia-Presbyterian alliance, such a nearness of plants must develop into a close relation for the best interest of hospital, of school and equally too of the Rockefeller Institute itself. This site fulfills all the theoretical requirements of an ideal hospital site. It will secure good air and light, and a southern exposure which will probably never be seriously threatened by the development of the Rockefeller Institute. It is situated in a tenement district and is in the district which has always been served by the Presbyterian Hospital wards and the hospital ambulance service.

The site under discussion, however, has some practical defects which are more or less serious. Although it is in the present Presbyterian Hospital district it is on the edge of that district and, being situated on the East River, it can never become more central than now, even by a redistricting of the city. This is of little consequence, perhaps, but a more serious objection is found in the present comparative inaccessibility of this East River site both for patients and for the friends and patrons who are the sources of the hospital's financial support. The nearest north and south car line is on First Avenue, one-seventh of a mile distant (800 feet), and there is no available crosstown line at all. This would be quite a change from the present hospital site, which is also on the edge of its district but situated in a prominent residential quarter of the city. The influence of this present site in securing recently some large testamentary bequests from previously unknown benefactors and in attracting financial support in general, cannot be accurately estimated, but that it has had an important influence in the past can scarcely be denied.

A recent development in the system of ambulance service districts in New York is of considerable interest and significance in regard to the future value of hospital sites in general and of this site on the East River in particular. The Presbyterian Hospital has served for many years with its ambulance equipment the district between 59th Street and 110th Street, Central Park West and the East River.

The service has always been done at the expense of the hospital without expense to the city and in an eminently efficient and satisfactory manner. The city authorities have recently taken away from the Presbyterian Hospital the best portion of this district and allotted it to the City Hospital on Blackwells Island. It is entirely irrelevant to this discussion and perhaps only a question for expert difference of opinion that cases of acute disease in this district would be better off if taken a mile distant to the Presbyterian Hospital for treatment according to the former system than that they should be taken first to a reception hospital on the Manhattan side of the East River and then transferred by boat to Blackwells Island and again by ambulance or stretcher to the City Hospital, as is now being done. But it is not a matter of indifference to the future Presbyterian Hospital service that its new site is not in its present limited ambulance district and that it has no guarantee of having any ambulance service at all. Of course the ambulance supply of acute disease is not an essential to any service but it is an element of no mean importance in supplying acute surgical emergencies including fractures and other accidents. In the past the ambulance calls at the Presbyterian Hospital were at least ten a day and now they are less than one-third of their former number. The nearness to the city institutions on Blackwell's Island may become an advantage to the school if those institutions can be utilized in education but it is of distinctly less value to the hospital and may be at times a distinct detriment.

A really serious objection to this site is to be found in the artificial hindrances which exist to a free development of hospital plans in a building restriction that forbids the erection of buildings over 60 feet high on the southerly border of the block and 50 feet back from the 67th Street building line. This would prohibit the adoption of the hospital plan which has been suggested above as the ideal one for New York City, or at least would limit the number of ward units which could be superposed in such a plan. When this land was purchased for the new Presbyterian Hospital this restriction was probably belittled as of no

consequence by the Presbyterian Hospital authorities, because the general plan of the present Presbyterian Hospital permits of such a restriction without detriment. But the building plan of the present hospital is not only not the best but is even one of the least desirable plans, and this restriction to height of buildings is really a serious block to a proper building plan. In spite of this restriction the proposed site is perhaps a possibility for an old-style New York City hospital with only loose connections with scientific and educational institutions, but when considered as a site for a combined hospital and medical school the objections increase in number although they may be surmountable. One of the prominent defects from this point of view is the existence on the block just north of the hospital site of a large modern brewery. This will prevent the combination of a hospital to the south and a medical school to the north, which was developed in the foregoing pages as the ideal grouping for such a combination. At least it will prevent it except at an expenditure far out of proportion to the value of the property to be secured. If the brewery were purchased it would mean its total demolition, for none of it would be serviceable as part of a group of buildings either for school or hospital. When this site was bought for the hospital the brewery was possibly considered as negligible, for at that time the alliance with Columbia had not been even thought of. A solution other than the ideal north and south relation of school and hospital must be adopted if this East River site is to be used. Land can probably be secured to the west of the hospital on the opposite side of Avenue A for the building of the school. This land, even with the necessity of tearing down certain buildings, will be far cheaper than will be the purchase of the brewery just referred to. Although such an east and west location will be inferior to the north and south plan it remains to be decided whether it is better to adopt the east and west site rather than to seek an entirely new site, where the ideal institutions can be developed in a north and south juxtaposition. This east and west relation, even if not the best theoretically, would give

a combined institution far in advance of anything now in existence in New York. If an entirely new site comparatively near the Rockefeller Institute is to be sought for, a consideration of the crosstown transportation facilities at 86th Street and at 59th Street should be a prominent factor in the choice.

If the question of the Sixty-seventh Street and East River site is open for discussion the subject would not be complete without some consideration of the plans of Columbia University which were formulated prior to the drawing-up of the alliance between the university and the Presbyterian Hospital and which proposed to move the College of Physicians and Surgeons to the neighborhood of the university. It is impossible to secure near Columbia University a site which will include two city blocks located north and south of each other except at the expense of tearing down substantial buildings of modern construction. The expense of an ideal site on Morningside Heights therefore is more or less comparable with the securing of a similar site at Sixty-seventh Street and East River and its necessary purchase of the brewery already referred to. Columbia University owns considerable vacant land about 116th Street but how much of this could be used for developing a proper clinical and educational institution is an open question and can be settled only after a consideration of all the university activities and not of the medical development alone.

In 1906 the State Charities Aid Association published an interesting report on the development of the hospital situation in New York. That report laid much stress on the fact that the east side of the city was over-supplied with hospital facilities while the west side above Forty-second Street was sadly lacking in hospital beds. This conclusion was based upon a study of the existing hospitals and the population of the various wards of the city. The same conditions exist to-day as in 1906 and there is no doubt but that Morningside Heights offers a better site for a general hospital than does the East River site at Sixty-seventh Street. It is more accessible; it is equally well-

supplied with light and air; it is on higher ground; it is less liable to be surrounded in the future by business nuisances. An effort was made last Spring to secure from the State Charities Aid Association an opinion as to the relative value of these two sites (Morningside Heights and East River and 67th Street) as a location for the future clinical and educational plant of the Presbyterian Hospital-Columbia University Alliance. This was not possible and the following correspondence will explain itself:

May 2nd, 1911.

Mr. Homer Folks, Secretary,
State Charities Aid Association,

My dear Mr. Folks—

As you are aware, an alliance has been brought about between the Presbyterian Hospital and the College of Physicians and Surgeons, the medical department of Columbia University. I write to you for an opinion upon the selection of a site for the combined medical school and hospital. As Dean of the school I feel that it is absolutely essential for the medical school to leave its present quarters in West Fifty-ninth Street and move to whatever situation shall be decided upon for the building of the Presbyterian Hospital. You are also aware that the Presbyterian Hospital has purchased a site on the East River between Sixty-seventh and Sixty-eighth Streets, just north of the land owned by the Rockefeller Institute. You may not be aware that Columbia University had planned to develop a new medical centre with the College of Physicians and Surgeons as a nucleus and a University hospital as a permanent feature of the same on Morningside Heights, near the present site of Columbia University. Columbia University has purchased half of the block bounded by Amsterdam Avenue and Morningside Parkway, 116th to 117th Street, and desired to secure the other half as a site for the proposed new medical school. The question arises in my mind, therefore, as to which is the better solution of the problem. Should

the medical school be built upon land to be secured in the neighborhood of the New East River site proposed for the Presbyterian Hospital, or should the Presbyterian Hospital sell its East River site and locate upon land on Morningside Heights? I am aware that the State Charities Aid has studied the development of the hospital situation in New York City, and I therefore write to you for an expert opinion as to the relative value of these two propositions. I wish you would give me your opinion as to the advantage of these two situations irrespective of the consideration of the advantages to the school of being near the University, or to the school and hospital being near the Rockefeller Institute. What I want to get at is, what is the relative value of the 116th Street and Amsterdam Avenue, in spite of its nearness to St. Luke's Hospital, and of Sixty-eighth Street and the East River, in spite of its nearness to the Flower Hospital, as a site for the new Presbyterian Hospital-Columbia University Medical School development.

Very sincerely yours,

(Signed) SAMUEL W. LAMBERT.

May 4th, 1911.

Dr. Samuel W. Lambert,
New York City.

Dear Doctor Lambert,—

I acknowledge the receipt of your favor of the 2nd instant, asking for an expression of opinion in the matter of the selection of site for the combined College of Physicians and Surgeons and Presbyterian Hospital. The general subject is one to which we have given some attention, and I should be glad to go over our data as to the growth of population in different portions of the city, and the present hospital provision in different portions of the city, and report to you such suggestions as occur to us, in the near future.

Thanking you for the opportunity to submit statements of such opinions as we may arrive at, I am,

Very sincerely yours,

(Signed) HOMER FOLKS,
Secretary.

June 20th, 1911.

Dr. Samuel W. Lambert,
New York City.

My dear Dr. Lambert,—

We have been turning over in our minds the matter referred to in your letter of the second of May relating to the location of the proposed new medical hospital and school. I think it is the present feeling of our committee that they would hesitate to offer their advice upon this question unless they were officially asked to do so by the trustees of the institution. If the trustees were to ask our opinion, we could then offer it without seeming in the slightest to be intruding our opinion.

Very truly yours,

(Signed) HOMER FOLKS,
Secretary.

It is to be regretted that the advantage to be secured from a study of the valuable statistics in the hands of the State Charities Aid Association cannot be applied to this question at the present time. It may be possible to secure this aid in the future, if asked for by some authority combining the interests of the Hospital and the University.

The final selection of a site must be decided on the following general principles:

(1) That the hospital and the school must be in close juxtaposition one to the other. (2) That the site fulfils the general requirements for a hospital. (3) That sufficient land is secured to enable the preparing of final plans for building both the hospital and the medical school. (4) That there will be a probability of securing further land, and thus insuring future development at a reasonable cost.

In formulating these four cardinal principles no account

is taken of association with other allied scientific institutions and the adjacency of the combined hospital and medical school either to the rest of the University or to the Rockefeller Institute is distinctly of infinitely less importance than is the question of the mutual propinquity of the hospital and the school to each other.

The ruling influence in the decision must be the question of land, and in considering all the points both for and against these various sites the conclusion seems forced upon any impartial observer that the site on Morningside Heights does not offer a proper chance for the future development of the medical centre of the University because the cost of land alone will be prohibitive. The further conclusion is equally forced to the front that the Sixty-seventh Street and East River site is far from meeting the ideal conditions which both the University and the Presbyterian Hospital are striving to attain. Where the ideal site is to be found is a subject for mutual conference and agreement between the authorities of the Hospital and those of the University. In order to facilitate such a conference the following presentation of the ideal conditions to be sought for have been formulated:

Completed Institution of the Alliance.—The conditions presented here for a final solution of this problem are probably not complete, but it is hoped they will serve as a beginning and will excite further discussion of the many points at issue. The final end to be secured, if possible, is to develop a combined hospital, educational and scientific medical centre in which all the specialties of medical practice shall have opportunity and room in which to develop.

The Presbyterian Hospital has at present and probably would have expected to duplicate in its new buildings in case no alliance with Columbia University had been perfected, the following departments:

1. A general medical service.
2. A general surgical service.
3. A children's service, which is mostly for children over two years of age.

4. A dispensary service for out-patients, which includes a partial list of the specialties of medicine, at present there are classes in children, in nervous diseases, in eye, in throat, in skin, in genito-urinary diseases and in gynaecology.

5. A pathological department, including bacteriology and chemistry.

6. A Roentgen ray department.

The Columbia University in addition to its other school facilities now supports the following departments and foundations, which are more or less fully devoted to clinical purposes:

1. Complete laboratory plants for pathology, clinical pathology, bacteriology, biological chemistry and pharmacology.

2. The Sloane Hospital for Women.

3. The Vanderbilt Clinic, which is an out-patient service containing classes in all the specialties of medicine, It has extensive laboratories for diagnosis and special therapeutic plants for mechanotherapy and hydrotherapy.

The terms of the alliance between the two institutions provide that the Presbyterian Hospital Trustees maintain a hospital and the Columbia Trustees maintain a medical school and support the educational and scientific work of the hospital. On this basis of mutual support the hospital will give up its pathological and its X-ray departments and delegate this work to the University. In order that this combination of interests may be properly carried on, the two institutions must build new plants in close physical contact and on the best lines and plans which the conditions and general contour of New York will permit. Columbia should rebuild the Sloane Hospital as a part of the general plant and also a new Vanderbilt Clinic in close relation both to the new Sloane and to the new general hospital of the Presbyterian Hospital corporation, and also to any other new hospitals or services for medical specialties which may be secured. The Presbyterian Hospital should not develop a new out-patient service, but should ally itself to

the new Vanderbilt Clinic, which should thus become the dispensary of the hospital.

The new feature of the combination of hospital and school, which is suggested above is the development of ward services for all the specialties represented in the Vanderbilt Clinic, which would automatically become the outpatient services of those ward services. The addition of such ward services for medical specialties to a general hospital is a further development of the present practice of many such hospitals. Certain general hospitals have special wards for gynaecology, for orthopedic surgery or for eye diseases. Many such hospitals, of which group the Presbyterian Hospital is one, have a special ward service for children. From the point of view of the school and of medical education every specialty should have its ward service and its dispensary service. If any of the existing hospitals in New York devoted to special work could be persuaded to form an alliance with the University similar to the fundamental one between the Presbyterian Hospital and Columbia a great step in advance would have been taken. Every inducement should be extended to such hospitals, especially to those which have antiquated plants, to consider the advantages to themselves of such an alliance. The needs of the various specialties are perhaps too great to be included in a general hospital, and it may be necessary to include special plants for all of them. In any case the securing of sufficient land to meet the possible demands in this direction will do much to bring about the desired end.

In conclusion, this fact must be insisted upon, that to the future belongs only the application of the general principles involved for the first and greatest and most difficult step has been taken and the alliance between the Presbyterian Hospital and Columbia marks the beginning of the first real medical centre in New York. In the hope that this discussion may further the interests and help to develop the details of the alliance, it is respectfully submitted.

SAMUEL W. LAMBERT,

Dean of the College of Physicians and Surgeons, Columbia University.

COLUMBIA UNIVERSITY LIBRARY

This book is due on the date indicated below, or at the expiration of a definite period after the date of borrowing, as provided by the rules of the Library or by special arrangement with the Librarian in charge.

DATE BORROWED	DATE DUE	DATE BORROWED	DATE DUE
C28(239)M100			

COLUMBIA UNIVERSITY LIBRARIES
0050086480
R747.C7
.I72
Ideal